

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1 1. (Currently Amended) A method of scheduling for use by a processor that controls storage
2 devices of a data storage system, comprising:
3 allocating processing time comprising a plurality of time slots between I/O operations and
4 background operations by ~~assigning~~causing the I/O operations and the background operations to
5 be performed during ~~predetermined~~assigned ones of the plurality of time slots based on an
6 indicator of processor workload.

1 2. (Original) The method of claim 1 wherein the indicator of processor workload comprises
2 an indicator of I/O loading on the processor when used to control I/O operations of one or more of
3 the storage devices.

1 3. (Original) The method of claim 2 wherein the indicator comprises a plurality of busy
2 levels indicative of different levels of I/O loading on the processor.

1 4. (Original) The method of claim 3 wherein allocating comprises determining the indicator
2 by determining the busy level.

1 5. (Original) The method of claim 4 wherein allocating comprises:
2 using a lookup table.

1 6. (Currently Amended) The method of claim 5 wherein the lookup table comprises rows
2 corresponding to the busy levels and each row comprises a plurality of elements corresponding to
3 the ~~predetermined~~assigned time slots.

1 7. (Original) The method of claim 6, wherein the elements correspond to I/O operations and
2 background operations, and the lookup table is populated with the elements corresponding to I/O
3 operations and background operations according to time percentages defining amounts of time
4 allocated to tasks associated with such operations.

1 8. (Original) The method of claim 7 wherein the time percentages are user-configurable
2 parameters.

1 9. (Original) The method of claim 7 wherein the determined busy level is used to index into
2 the lookup table to select one of the I/O or background operations elements.

1 10. (Original) The method of claim 9 wherein the time percentages change with each row.

1 11. (Original) The method of claim 9 wherein the time percentage of the I/O operations
2 elements increases as the busy levels increase.

12. (Original) The method of claim 6 wherein the I/O operations elements and the background operations elements are distributed uniformly throughout a given row according to their respective time percentages.

13. (Currently Amended) The method of claim 6 wherein the background operations comprise pending background tasks maintained on a queue and wherein allocating further comprises:

causing an I/O task to be selected for execution in a next one of the ~~predetermined~~-time slots if the selected one of the I/O or background operations elements is an I/O operations element; and

otherwise selecting a next one of the pending background tasks from the queue for execution in a next one of the ~~predetermined~~-time slots if the selected one of the I/O or background operations elements is a background operations element.

14. (Original) The method of claim 4 wherein the busy level is computed at periodic intervals.

15. (Original) The method of claim 13 wherein determining the busy level comprises:
obtaining a most recently computed value of the busy level;
examining statistics related to idle time as well as time spent performing I/O tasks associated with I/O operations and non-I/O background tasks associated with background operations;

6 using the statistics to redistribute time between the idle time and the time spent performing
7 the non-I/O background tasks to increase the time spent performing the non-I/O background tasks;
8 and
9 adjusting the last computed value of the busy level based on redistribution of time.

1 16. (Original) The method of claim 1 wherein the background operations comprise pending
2 non-I/O background tasks including data copy related activities.

1 17. (Currently Amended) The method of claim 1 wherein the duration of the ~~predetermined~~
2 time slots is a user-configurable parameter.

1 18. (Currently Amended) An apparatus, comprising:
2 a stored computer program in memory instituting the step of
3 allocating processing time comprising a plurality of time slots between I/O operations and
4 background operations by ~~assigning~~ causing the I/O operations and the background operations to
5 be performed during ~~predetermined~~ assigned ones of the plurality of time slots based on an
6 indicator of processor workload.

1 19. (Currently Amended) A data storage system comprising:
2 a plurality of physical resources; and
3 a processor for managing the plurality of physical resources, the processor configured to
4 allocate processing time comprising a plurality of time slots between I/O operations and

background operations by ~~assigning~~ causing the I/O operations and the background operations to be performed during ~~predetermined~~ assigned ones of the plurality of time slots based on an indicator of processor workload.

20. (Previously Presented) A method of scheduling for use by a processor that controls storage devices of a data storage system, comprising:

allocating processing time between I/O operations and background operations for predetermined time slots based on an indicator of processor workload, wherein the indicator is an indicator of I/O loading on the processor and comprises a plurality of busy levels indicative of different levels of I/O loading on the processor, and wherein allocating comprises using a lookup table comprising rows corresponding to the busy levels, wherein each row comprises a plurality of elements corresponding to the predetermined time slots, and wherein the background operations comprise pending background tasks maintained on a queue and wherein allocating further comprises:

causing an I/O task to be selected for execution in a next one of the predetermined time slots if the selected one of the I/O or background operations elements is an I/O operations element; and

otherwise selecting a next one of the pending background tasks from the queue for execution in a next one of the predetermined time slots if the selected one of the I/O or background operations elements is a background operations element.